Japan Patent Office
Public Patent Disclosure Bulletin

Public Patent Disclosure Bulletin No.:	52-60500
Public Patent Disclosure Bulletin Date:	May 18, 1977
Request for Examination:	Made
Total Pages:	4

Int. Cl.[2]		Japan Classification	Identification No.	Internal File No.
B 26 B	1/02	76 D331		7512 33

Patent Application No.:	50-136983
Patent Application Date:	November 13, 1975
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Specifications

1. Title of Invention:

Switch-blade knife

2. Claims:

(1) A switch-blade knife, characterized in that

a blade, the base end of which is attached by a pivot so that its front end can rotate;

an engaging means which is arranged with respect to the rear end [of the blade] so that it engages the front end of the blade in such a way that it can be released, and in such a way that the aforementioned blade in its closed state does not open; and

a spring, one end of which is attached to the base end of the aforementioned blade and in such a way that said blade is always forced in the closed direction

are placed between the side plates of the handle.

3. Detailed Explanation of Invention:

This invention concerns a switch-blade knife. Its purpose is to provide a switch-blade knife which can be easily operated due to the facts that the blade can be reliably opened with one touch, the number of parts of the knife is made small, and no back part, which causes trouble during assembly, is used.

A working embodiment of this invention will be explained below with reference to the drawings. In Fig., 1, 1 is the whole handle; 2 is a pair of right and left side plates which form the sides of the handle 1, and 3 is a connecting part which joins the backs of these side plates to make the handle into a single body.

4 is a pivot which is fixed between the front ends of the side plates 2; 5 is a blade, which is attached by passing the pivot 4 through a elongated hole 6 formed in its base end, in such a way that it can both rotate and move back and forth. As shown in Fig. 3, when the blade is opened and moved backward, i.e., when the front end of the elongated hole 6 is engaged by the pivot 4, the back of the base end is engaged by the inner surface of the connecting part 3 and the rotational radius R of the base end circumference, with the pivot 4 as its center, becomes greater. Therefore, the rotational track of the base end circumference and the connecting part 3 interfere with each other, whereas when the rear end 6 of the elongated hole 6 is engaged by the pivot 4, the rotational radius r of the base end circumference becomes smaller, and they do not interfere with each other. Furthermore, the elongated hole 6 is formed obliquely, so that it becomes closer to the belly side the closer it gets to the front of the knife.

7 is a guide pin, which is fixed between the rear ends of the side plates 2. 8 is a engaging part which is attached so that it can move back and forth with respect to this guide pin 7, which is in a elongated hole 9 formed in the center part of the engaging part. 10 is a engaging part formed in the inner end of the belly side of the engaging element 8; when this engaging element 8 has been moved forward and the rear end of the elongated hole 9 is engaged by the guide pin 7, it engages the blade 5 so that it does not open and it covers the back of the front end of the blade 5, which is in the closed state. Moreover, when the engaging element 8 has been moved backward, this engaging operation is released. 11 is a step part which is formed in the back part of the rear end of the engaging element 8; it is able to engage the rear end of the aforementioned connecting part 3. 12 is an attachment hole which is made through the rear end of the engaging element 8; by means of it, a cord, etc., can be attached to the knife.

13 is a spring, the ends of which are engaged with engaging holes 14 which are formed in the base end of the aforementioned blade 6 and the front end of the engaging element 8. It exerts a force in a direction such that the blade 5 and the engaging element 8 are pushed towards each other, i.e., the blade 5, in the closed state, tends to rotate in the clockwise direction with the pivot 4 as a center, and the engaging element 8 is forced forward.

Fig. 1 shows the state in which the blade 5 is closed against the force of the spring; the engaging element 8 is moved forward by the force of the spring 13, and its engaging part 10 engages the back of the front end of the blade 5.

To open the blade 5 from this state, the engaging element 8 is pulled backward, against the force of the spring, as shown in Fig. 2, whereupon the engagement of the front end of the blade 5 by the engaging part 10 is released, and the blade 5 snaps out due to the force of the spring, rotating in the counter-clockwise direction.

When the blade 5 rotates almost 180°, as shown in Fig. 3, the blade 5 moves backward due to the force of the spring 13; the front end of its elongated hole 6 is engaged by the pivot 4, and the back of the base end is engaged by the inner surface of the connecting part 3. Therefore, in this state, the blade 5 cannot rotate in the clockwise direction, and since the distance between the pivot 4 and the base end circumference of the blade 5 becomes greater and the rotation track of this base end circumference interferes with the connecting part 3, rotation in the counter-clockwise direction is also impossible. That is, the blade 5 is now locked.

Next, in order to close the blade 5 from this state, as shown in Fig. 4, the blade 5 is first pulled forward, so that the rear end of the elongated hole 6 engages the pivot 4. When this is done, the pivot 4 and the base end circumference of the blade 5 are closer to each other and the rotational radius 4 of the base end circumference becomes shorter; its rotational track no longer interferes with the connecting part 3, so that the blade 5 can now rotate counter-clockwise. Furthermore, since the elongated hole 6 is made so that it becomes closer to the belly side the closer it gets to the front of the knife, the back part of the base end of the blade 5 is separated from the connecting part 3 by the pulling of the blade.

When this is done, the blade is rotated counter-clockwise, and the engaging element 8 is pulled backwards, so that it does not touch the front end of the blade 5. Furthermore, the blade 5 is completely embedded between the side plates 2, and it releases the engaging element 8. When this happens, the engaging element 8 moves forward, due to the force of the spring 13, and the engaging part 10 engages the front end of the back of the blade 5.

Thus, the switch-blade knife of this invention has the advantage that it can be reliably opened, that is, its blade 5 can be allowed to spring out from between the side plates 2, by simply pulling the engaging element 8 backwards, i.e., with one touch.

Furthermore, the switch-blade knife of this invention has the effect of a simplified operation, since not only is a complex mechanism not required for causing the blade 5 to spring out, but a back part, which causes trouble in the assembly, is not needed either.

Furthermore, if, as in this working embodiment, the hole of the blade 5 for attaching it to the pivot 4 is made a elongated hole 6, and, as mentioned above, the rotational

track of its base end circumference and the connecting part 3 interfere with each other when the blade 5 is opened, then the locking mechanism locking it can be formed simply by the aforementioned elongated hole 6.

Similarly, if, as in this working embodiment, the base end of the blade 5 and the engaging part 6 are connected by the spring 13, which exerts its force in such a way that they are pulled towards each other, and the engaging part 10 engages in such a way as to cover the end of the blade 5, then, when the blade 5 is closed, its front end is covered by the engaging element 8 which has been forced forward, and therefore it is safer.

Furthermore, this invention is not limited to the working embodiment described above; it can also be embodied as described below.

(a) One can pass a cord, etc., through the attachment hole 12 to make pulling the engaging element 8 easier.

(b) One can attach the end of the spring 13, on its engaging element 8 side, to an arbitrary fixed part of the handle 1.

(c) One can wrap the spring around the pivot 4, attaching one end of it to a fixed part of the handle 1 and the other end to the base end of the blade 5, so that it forces the blade 5 in the open direction.

(d) One can vary the kind of spring and the method of attaching it in other ways, within ranges which do not fall outside the Claim of this Application.

(e) The blade can be changed in various ways to form a scissors, nail clipper, bottle opener, can opener, file, etc., besides the blade 5.

(f) The elongated hole 6 in the base end of the blade 5 can be made a hole into which the pivot 4 is simply inserted.

This invention, as described in detail above, is an invention which is an excellent one as a switch-blade knife, since it has the effect that the blade opens reliably and its operation can be made simple. This is due to the fact that a blade, the base end of which is attached by a pivot so that its front end can rotate, an engaging means which is arranged with respect to the rear end [of the blade] so that it engages the front end of the blade in such a way that it can be released and in such a way that the aforementioned blade in its closed state does not open, and a spring, one end of which is attached to the base end of the aforementioned blade and in such a way that said blade is always forced in the closed direction, are placed between the side plates of the handle.

4. Simple Explanation of Drawings:

Fig. 1 is a cross sectional drawing showing the closed state of the switch-blade knife of this invention; Fig. 2 is a cross sectional drawing showing the state immediately after the operation of opening the blade of the switch-blade knife of this invention was started; Fig. 3 is a cross sectional drawing showing the state in which the blade of the switch-blade knife of this invention is completely opened; and Fig. 4 is a cross sectional drawing showing the state in which the blade of the switch-blade knife of this invention has been pulled forward.

Handle 1, side plates 2, pivot 4, blade 5, engaging element 8, engaging part 10, spring 13

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Fig. 1

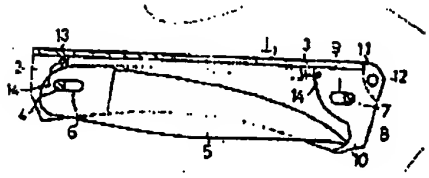

Fig. 2

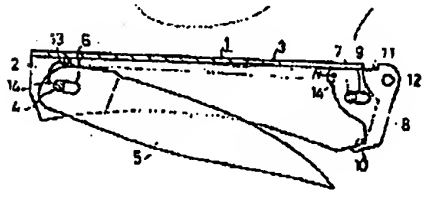

Fig. 3

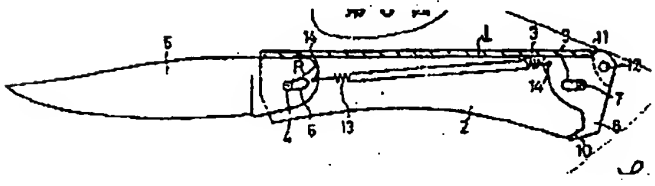

Fig. 4